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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Krzysztof W. Przytula

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TOPE-MCKAY & ASSOCIATES
23852 PACIFIC COAST HIGHWAY #311
MALIBU, CA 90265

EXAMINER

PATEL, SHAMBHAVI K

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/692,697	Applicant(s) PRZYTULA ET AL.	
	Examiner SHAMBHAVI PATEL	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-26, 28-43, 45-60 and 62-68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-26, 28-43, 45-60 and 62-68 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendments/Remarks submitted 15 February 2008.
2. Claims 1-9, 11-26, 28-43, 45-60 and 62-68 have been presented for examination.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Response to Arguments

4. In view of Applicant's supporting arguments, the Declaration Under 37 CFR 1.131 is accepted, and the prior art rejection issued 27 September 2007 is withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1-9, 11-26, 28-43, 45-60 and 62-68 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite** for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 18, 35 and 52:

- i. the terms “evidence node”, “conclusion node”, “evidence state” and “conclusion state” are vague and indefinite. The Examiner was unable to find a limiting definition for these terms in the specification.
- ii. the limitation “determining...a plurality of samples of most likely states of the evidence nodes” is vague and indefinite. What is the threshold value for determining which values of states are “most likely” to occur? The meaning of the term “samples” within the context of the limitation is indefinite.
- iii. the limitation “setting the states of the evidence nodes to states corresponding to the plurality of samples of the evidence states” is vague and indefinite. Based on the previous limitation, it

appears that more than one value for each state is ascertained. How is it determined which of these plurality of values will be assigned to each of the evidence nodes?

- iv. the limitation “...to obtain a plurality of probabilities of the resulting states of the conclusion nodes” is indefinite. Is a plurality of probabilities for each node obtained? Or is just one probability for each node obtained?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1, 2, 16, 18, 19, 33, 35, 36, 50, 52, 53 and 67 are rejected under 35 U.S.C. 102(b)** as being clearly anticipated by Nadkarni (“A Bayesian Network Approach to Making Inferences in Causal Maps”).

Regarding claims 1, 18, 35 and 52:

Nadkarni discloses a method for automatically evaluating Bayesian network models for decision support comprising:

- a. receiving a Bayesian Network (BN) model (**abstract**) including evidence nodes (**section 4.1.2 effect nodes**) and conclusion nodes (**section 4.1.2 cause nodes**), where the conclusion nodes are linked with the evidence nodes by causal dependency links (**figure 2**), and where the evidence nodes have evidence states and the conclusion nodes have conclusion states (**section 3 “state space”**).
- b. setting the states of the conclusion nodes to desired conclusion states and determining, by propagating down the causal dependency links (**section 4.1.2: deductive reasoning from causes to effect**), a corresponding probability of occurrence of evidence states of the evidence nodes and

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producing, from the probability of occurrence, a plurality of samples of most likely states of the evidence nodes (**section 3.2: posterior joint distribution of variables calculated**)

- c. setting the states of the evidence nodes to states corresponding to the plurality of samples of the evidence states (**section 4.1.2: abductive reasoning from effect to causes**), and propagating the evidence states back up the causal dependency links to the conclusion nodes, to obtain a plurality of probabilities of the resulting states of the conclusion nodes (**section 3.2: posterior joint distribution of variables calculated**)
- d. outputting a representation of the plurality of the probabilities of the states of the conclusion nodes (**Table 2**)

Regarding claims 2, 19, 36 and 53:

Nadkarni discloses at least one auxiliary node causally linked between at least one evidence node and at least one conclusion node (**figure 8**).

Regarding claims 16, 33, 50, and 67:

Nadkarni discloses weighting the conclusion nodes by weights representing their importance; whereby the accuracy of the BN model's propensity to yield proper conclusions may be weighted for particular conclusions based on their relative importance (**section 4.2.1 strength of causal connections**).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3-9, 11-15, 20-26, 28-32, 37-43, 45-49, 54-60, and 62-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni (“A Bayesian Network Approach to Making Inferences in Causal Maps”), in view of Murphy (‘Dynamic Bayesian Networks: Representation, Inference and Learning’).

Regarding claims 3, 11, 20, 28, 37, 45, 54, and 62:

Nadkarni does not explicitly disclose a method for automatically evaluating Bayesian network models for decision support, wherein the sampling is performed by a Monte Carlo algorithm. **Murphy teaches** performing Bayesian sampling using the Monte Carlo method (**Murphy: section 5.1 ‘Introduction’**). At the time of the invention, it would have been obvious to one or more of ordinary skill in the art to combine the teachings of Nadkarni and Murphy because the Monte Carlo method are easy to implement, they work on almost any kind of model, and they are guaranteed to give the exact answer (**Murphy: section 5.1 paragraph 2**).

Regarding claims 4, 21, 38, and 55:

The combination of Nadkarni and Murphy as applied to claims 3, 20, 37, and 54 above teach an outputted representation that is a complete representation of probabilities of states for all conclusions given a particular set of combinations of conclusion states (**Murphy: figure 5.9**).

Regarding claims 5, 22, 39, and 56:

The combination of Nadkarni and Murphy as applied to claims 4, 21, 38, and 55 above teach a graphical outputted representation (**Murphy: figure 5.9**).

Regarding claims 6, 23, 40, and 57:

The combination of Nadkarni and Murphy as applied to claims 4, 21, 38, and 55 above teaches automatically evaluating Bayesian network models for decision support, where the outputted representation is a matrix of averages of probabilities of the conclusion states for implicated conclusions versus a selected set of combinations of conclusion states, whereby a user can determine an accuracy of the BN model's propensity to yield proper conclusions (**Murphy: page 176 first paragraph**).

Regarding claims 7, 24, 41, and 58:

The combination of Nadkarni and Murphy as applied to claims 6, 23, 40, and 57 above teaches automatically evaluating Bayesian network models for decision support, wherein the outputted representation is a graphical representation in the form of a two-dimensional intensity matrix (**Murphy: figure 5.9**), and a three-dimensional bar chart (**Murphy: figures 4.3 and 4.4**)

Regarding claims 8, 25, 42, and 59:

Nadkarni discloses weighting the conclusion nodes by weights representing their importance; whereby the accuracy of the BN model's propensity to yield proper conclusions may be weighted for particular conclusions based on their relative importance (**section 4.2.1 strength of causal connections**).

Regarding claims 9, 26, 43, and 60:

Nadkarni discloses weighting the conclusion nodes by weights representing their importance; whereby the accuracy of the BN model's propensity to yield proper conclusions may be weighted for particular conclusions based on their relative importance (**section 4.2.1 strength of causal connections**).

Regarding claims 12, 29, 46, and 63:

Nadkarni does not explicitly disclose an outputted representation that is a complete representation of probabilities of states for all conclusions given a particular set of combinations of conclusion states. **Murphy teaches** an outputted representation that is a complete representation of probabilities of states for all conclusions given a particular set of combinations of conclusion states (**Murphy: figure 5.9**). At the time of the invention, one of ordinary skill in the art would have obviously combined the teachings of Nadkarni and Murphy because the algorithm presented by Murphy can be performed in a short amount of time (**Murphy: 'Introduction'**).

Regarding claims 13, 30, 47, and 64:

Nadkarni does not explicitly disclose a method for automatically evaluating Bayesian network models for decision support as set forth in claim 1, wherein the outputted representation is a graphical representation. **Murphy teaches** a graphical outputted representation (**Murphy: figure 5.9**). At the time of the invention, one of ordinary skill in the art would have obviously combined the teachings of Nadkarni and Murphy because the algorithm presented by Murphy can be performed in a short amount of time (**Murphy: 'Introduction'**).

Regarding claims 14, 31, 48, and 65:

Nadkarni does not explicitly disclose an outputted representation that is a matrix of averages of probabilities of the conclusion states for implicated conclusions versus a selected set of combinations of conclusion states; whereby a user can determine an accuracy of the BN model's propensity to yield proper conclusions. **Murphy teaches** automatically evaluating Bayesian network models for decision support, where the outputted representation is a matrix of averages of probabilities of the conclusion states for implicated conclusions versus a selected set of combinations of conclusion states, whereby a user can determine an accuracy of the BN model's propensity to yield proper conclusions (**Murphy: page 176 first paragraph**). At the time of the invention, one of ordinary skill in the art would have obviously combined the teachings of Nadkarni and Murphy because the algorithm presented by Murphy can be performed in a short amount of time (**Murphy: 'Introduction'**).

Regarding claims 15, 32, 49, and 66:

Nadkarni does not explicitly disclose a method for automatically evaluating Bayesian network models for decision support as set forth in claim 1, wherein the outputted representation is a graphical representation in the form of a two-dimensional intensity matrix and a three-dimensional bar chart. **Murphy teaches** automatically evaluating Bayesian network models for decision support, wherein the outputted representation is a graphical representation in the form of a two-dimensional intensity matrix (**Murphy: figure 5.9**), and a three-dimensional bar chart (**Murphy: figures 4.3 and 4.4**). At the time of the invention, one of ordinary skill in the art would have obviously combined the teachings of Nadkarni and Murphy because the algorithm presented by Murphy can be performed in a short amount of time (**Murphy: ‘Introduction’**).

8. **Claims 17, 34, 51, and 68 are rejected under 35 U.S.C. 103(a)** as being unpatentable over **Nadkarni (“A Bayesian Network Approach to Making Inferences in Causal Maps”)**, in view of **Skaanning et al. (US Pub. No. 2001/0011260)**,

Regarding claims 17, 34, 51, and 68:

Nadkarni does not explicitly disclose a diagnostic system. **Skaanning teaches** automatically evaluating Bayesian network models for decision support, wherein the BN model models a diagnostic domain (**abstract**), with the conclusion nodes representing component failures or diseases (**[0028]**), the evidence nodes representing recognizable symptoms of those failures or diseases (**[0028]**), and the auxiliary nodes representing additional information useful in conjunction with the evidence nodes and conclusion nodes (**figure 7 node 501; [0195] – [0199]**). At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine the teachings of Nadkarni and Skaanning to make the quality of the diagnostic process as high as possible while maintaining the efficiency of the knowledge acquisition as low as possible (**Skaanning: [0031]**).

Conclusion

9. Examiner's Remarks: Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is (571) 272-5877. The examiner can normally be reached on Monday-Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kamini S Shah/

Supervisory Patent Examiner, Art Unit 2128

SKP

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